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(54) Title: RAMAN-ENHANCING, AND NON-LINEAR OPTICALLY ACTIVE NANO-SIZED OPTICAL LABELS AND USES THEREOF

(57) Abstract: A composition is disclosed which is capable of being used for detection, comprising an encapsulated noble metal nanocluster. Methods for preparing the encapsulated noble metal nanoclusters, and methods of using the encapsulated noble metal nanoclusters are also disclosed. In certain embodiments, the noble metal nanoclusters are encapsulated by a dendrimer, a peptide, a small organic or inorganic molecule, or an oligonucleotide. The encapsulated noble metal nanoclusters have a characteristic spectral emission, wherein said spectral emission is varied by controlling the nature of the encapsulating material, such as by controlling the size of the nanocluster, the generation of a dendrimer, the incorporation of a functional group, and wherein said emission is used to provide information about a biological state. The emission is selected from the group consisting of nanocluster fluorescence, multiphoton excited nanocluster fluorescence, Stokes or Anti-Stokes Raman emission from the encapsulating material, and second harmonic generation.



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